

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (canceled)
2. (canceled)
3. (canceled)
4. (canceled)
5. (canceled)
6. (canceled)
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8. (canceled)
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10. (canceled)
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12. (canceled)
13. (canceled)
14. (canceled)
15. (canceled)
16. (canceled)
17. (canceled)
18. (canceled)
19. (canceled)
20. (canceled)
21. (new) A device for use with a transducer to extract an analyte from a sample, the sample containing cells or viruses, the device comprising a cartridge having:
 - a) a lysing chamber for lysing the cells or viruses to release the analyte therefrom, wherein the lysing chamber contains capture material for capturing the cells or

- viruses in the sample as the sample flows through the lysing chamber, and wherein the lysing chamber is defined by at least one wall having an external surface to which the transducer may be coupled;
- b) at least one waste chamber for receiving used sample fluid that has flowed through the lysing chamber;
 - c) at least a third chamber for receiving the analyte released from the cells or viruses; and
 - d) at least one flow controller for directing the used sample fluid, from which the cells or viruses have been separated, to flow into the waste chamber after the sample fluid flows through the lysing chamber and for directing the analyte released from the cells or viruses to flow into the third chamber.
22. (new) The device of claim 21, wherein the third chamber comprises a mixing chamber for mixing the analyte with one or more reagents.
23. (new) The device of claim 22, wherein the cartridge further includes a reaction chamber in fluid communication with the mixing chamber for holding the analyte for chemical reaction or optical detection.
24. (new) The device of claim 22, wherein the cartridge further includes:
- i) a reaction chamber in fluid communication with the mixing chamber for amplifying the analyte; and
 - ii) a capillary electrophoresis area in communication with the reaction chamber.
25. (new) The device of claim 21, wherein the third chamber comprises a reaction chamber for amplifying the analyte and holding the analyte for optical detection, and wherein the cartridge is in combination with an instrument having a heater for heating the reaction chamber and having at least one optical detector for detecting the analyte.
26. (new) The device of claim 21, wherein the third chamber comprises a reaction chamber for amplifying the analyte.
27. (new) The device of claim 21, wherein the wall is dome-shaped and convex with respect to the transducer.

28. (new) The device of claim 21, wherein the wall comprises a sheet or film of polymeric material.
29. (new) The device of claim 28, wherein the wall has a thickness in the range 0.025 to 0.1 mm.
30. (new) The device of claim 21, wherein the wall has stiffening ribs extending radially from a central portion of the wall.
31. (new) The device of claim 21, wherein the cartridge includes a sample chamber having a port for introducing a sample into the cartridge and further includes a sample flow path extending from the sample chamber, the lysing chamber being in the sample flow path.
32. (new) The device of claim 21, wherein the at least one flow controller comprises at least one valve for directing the used sample fluid to flow into the waste chamber via a first flow path in the cartridge and for directing the analyte to flow into the third chamber via a second flow path in the cartridge.
33. (new) The device of claim 21, wherein the capture material comprises at least one filter having a pore size sufficient to capture the cells or viruses.
34. (new) The device of claim 33, further comprising beads in the lysing chamber for rupturing the cells or viruses.
35. (new) The device of claim 21, wherein the capture material comprises beads.
36. (new) The device of claim 21, further comprising beads disposed in the lysing chamber for rupturing the cells or viruses.
37. (new) The device of claim 36, wherein the wall is sufficiently deflectable to deflect in response to vibratory movements of the transducer to generate pressure waves or pressure pulses in the lysing chamber.
38. (new) The device of claim 36, wherein the beads further have a binding affinity for the cells or viruses to be disrupted.
39. (new) The device of claim 36, wherein the beads further have a binding affinity for the analyte.

40. (new) The device of claim 21, wherein the capture material comprises a first set of beads for binding the cells or viruses, and wherein the lysing chamber further contains a second set of beads for rupturing the cells or viruses.
41. (new) A device for extracting nucleic acid from a sample, the sample containing cells or viruses, the device comprising a cartridge having:
- a) a lysing chamber for lysing the cells or viruses to release the nucleic acid therefrom, wherein the lysing chamber contains capture material for capturing the cells or viruses as the sample flows through the lysing chamber, and wherein the lysing chamber further contains binding material for binding the nucleic acid released from the lysed cells or viruses until the nucleic acid is eluted from the lysing chamber;
 - b) at least one waste chamber for receiving used sample and wash fluid from the lysing chamber;
 - c) a third chamber for receiving the nucleic acid eluted from the lysing chamber; and
 - d) at least one flow controller for directing the used sample and wash fluid to flow into the at least one waste chamber and for directing the eluted nucleic acid to flow into the third chamber.
42. (new) The device of claim 41, wherein the third chamber comprises a mixing chamber for mixing the nucleic acid with one or more reagents.
43. (new) The device of claim 42, wherein the cartridge further includes a reaction chamber in fluid communication with the mixing chamber for holding the nucleic acid for chemical reaction or optical detection.
44. (new) The device of claim 42, wherein the cartridge further includes:
- i) a reaction chamber in fluid communication with the mixing chamber for amplifying the nucleic acid; and
 - ii) a capillary electrophoresis area in communication with the reaction chamber.
45. (new) The device of claim 41, wherein the third chamber comprises a reaction chamber for amplifying the nucleic acid and holding the nucleic acid for optical detection, and

- wherein the cartridge is in combination with an instrument having a heater for heating the reaction chamber and having at least one optical detector for detecting the nucleic acid.
46. (new) The device of claim 41, wherein the third chamber comprises a reaction chamber for amplifying the nucleic acid.
47. (new) The device of claim 41, wherein the lysing chamber is defined by at least one wall having an external surface to which an ultrasonic transducer may be coupled, and wherein the wall is sufficiently deflectable to deflect in response to vibratory movements of the transducer to generate pressure waves or pressure pulses in the lysing chamber.
48. (new) The device of claim 41, wherein the cartridge includes a sample chamber having a port for introducing a sample into the cartridge and further includes a sample flow path extending from the sample chamber, the lysing chamber being in the sample flow path.
49. (new) The device of claim 41, wherein the at least one flow controller comprises at least one valve for directing the used sample and wash fluid to flow into the waste chamber via a first flow path in the cartridge and for directing the nucleic acid to flow into the third chamber via a second flow path in the cartridge.
50. (new) The device of claim 41, wherein the capture material comprises at least one filter.
51. (new) The device of claim 41, wherein the capture material comprises beads.
52. (new) The device of claim 51, wherein the beads are coated with antibodies or receptors for binding the cells or viruses.
53. (new) The device of claim 41, wherein the binding material comprises beads.
54. (new) The device of claim 53, wherein the beads comprise silica.
55. (new) The device of claim 53, wherein the beads comprise cellulose.
56. (new) The device of claim 21, wherein the capture material comprises a first set of beads for capturing the cells or viruses, and wherein the binding material comprises a second set of beads for binding the nucleic acid.
57. (new) A device for extracting nucleic acid from a sample, the sample containing cells or viruses, the device comprising a cartridge having:
- a) a lysing chamber for lysing the cells or viruses to release the nucleic acid therefrom, wherein the lysing chamber contains capture material for capturing the

- cells or viruses as the sample flows through the lysing chamber, and wherein the lysing chamber further contains removal material for holding unwanted material in the lysing chamber while the nucleic acid is eluted from the lysing chamber;
- b) at least one waste chamber for receiving used sample fluid that has flowed through the lysing chamber;
 - c) a third chamber for receiving the nucleic acid eluted from the lysing chamber; and
 - d) at least one flow controller for directing the used sample fluid, that has flowed through the lysing chamber, to flow into the at least one waste chamber and for directing the eluted nucleic acid to flow into the third chamber.
58. (new) The device of claim 57, wherein the third chamber comprises a mixing chamber for mixing the nucleic acid with one or more reagents.
59. (new) The device of claim 58, wherein the cartridge further includes a reaction chamber in fluid communication with the mixing chamber for holding the nucleic acid for chemical reaction or optical detection.
60. (new) The device of claim 58, wherein the cartridge further includes:
- i) a reaction chamber in fluid communication with the mixing chamber for amplifying the nucleic acid; and
 - ii) a capillary electrophoresis area in communication with the reaction chamber.
61. (new) The device of claim 57, wherein the third chamber comprises a reaction chamber for amplifying the nucleic acid and holding the nucleic acid for optical detection, and wherein the cartridge is in combination with an instrument having a heater for heating the reaction chamber and having at least one optical detector for detecting the nucleic acid.
62. (new) The device of claim 57, wherein the third chamber comprises a reaction chamber for amplifying the nucleic acid.
63. (new) The device of claim 57, wherein the lysing chamber is defined by at least one wall having an external surface to which an ultrasonic transducer may be coupled, and wherein the wall is sufficiently deflectable to deflect in response to vibratory movements of the transducer to generate pressure waves or pressure pulses in the lysing chamber.

64. (new) The device of claim 63, further comprising beads in the lysing chamber for rupturing the cells or viruses.
65. (new) The device of claim 57, wherein the cartridge includes a sample chamber having a port for introducing a sample into the cartridge and further includes a sample flow path extending from the sample chamber, the lysing chamber being in the sample flow path.
66. (new) The device of claim 57, wherein the at least one flow controller comprises at least one valve for directing the used sample fluid to flow into the waste chamber via a first flow path in the cartridge and for directing the nucleic acid to flow into the third chamber via a second flow path in the cartridge.
67. (new) The device of claim 57, wherein the capture material comprises at least one filter.
68. (new) The device of claim 57, wherein the capture material comprises beads.
69. (new) The device of claim 68, wherein the beads are coated with antibodies or receptors for binding the cells or viruses.
70. (new) The device of claim 57, wherein the removal material comprises beads.
71. (new) The device of claim 70, wherein the beads are capable of binding proteins or peptides.
72. (new) The device of claim 70, wherein the beads are capable of binding salts, metal ions, or detergents in the sample.
73. (new) The device of claim 70, wherein the beads are ion exchange beads.
74. (new) The device of claim 70, wherein the beads have metal ion chelators.
75. (new) The device of claim 57, wherein the capture material comprises a first set of beads for capturing the cells or viruses, and wherein the removal material comprises a second set of beads for binding the unwanted material.